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—THE— CANADIAN ARCHITECT AND BUILDER,

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(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD),

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DECORATORS, BUILDERS, CONTRACTORS, AND MANU-
FACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.

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64 TEMPLE BUILDING, MONTREAL.

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Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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WE had hoped to be able to print in this number the remainder of the papers read at the recent convention of the Province of Quebec Association of Architects, but the space at our disposal proves not to be sufficient for the purpose. In consequence the interesting paper by Mr. Baillairgé, of Quebec, on "Means of Escape from Public Buildings in Case of Fire," is held over until next issue.

IN placing heavy weights on a floor, such, for instance, as a safe, it is often desired to know which is the best position for safety. This is easily determined. The floor boards will show the direction of the joists, and the safe should be placed in such a position that it rests on the ends of the joists, so that several of them support it. If the safe were placed against the middle of a wall to which the joists run parallel, the weight would all rest on two, or at the most three joists, and at the worst place, viz., the centre.

A BUREAU of Hygiene and Sanitation has been organized to prepare a collective exhibit for the Columbian Exhibition illustrative of the present condition of sanitary science. Dr. F. W. Brewer is the Superintendent of the Bureau. In this connection we observe that the Provincial Board of Health of Ontario has decided to assist in collecting the material for a Canadian special Sanitary exhibit at the World's Fair. With that object communication will be had with the local boards of health and with manufacturers and dealers in sanitary appliances.

THE preliminary arrangements have been made for a Canadian art exhibit at the Columbian Exhibition. A Committee, representing the various art societies, will select the subjects at exhibitions to be held in Montreal and Toronto in February. A hanging committee will be appointed and a competent person to represent Canadian artists at Chicago. The hanging committee will assume the responsibility for the safe return of the exhibits to Canada. It is to be regretted that the enthusiasm which is being manifested by the artists has not also taken possession of the architects.

WE understand that some sixty designs were submitted in the preliminary competition for plans for public buildings at Victoria, B. C., to which reference was made in our last issue. Mr. S. G. Curry, President of the Ontario Association of Architects, and Mr. A. T. Taylor, member of the Council of the Province of Quebec Association of Architects, have been appointed to judge the designs, and to select the five which in their opinion possess the most merit. The authors of these will be required to submit designs in a final competition. Messrs. Curry and Taylor are at present in British Columbia making an examination of the preliminary designs.

Building contractors might well learn the lesson of how to estimate from the contractors for public works, who, while dealing with contracts of vastly greater magnitude, vary but slightly in their tenders. As an example, we may cite the case of the tenders for the construction of the Soulanges Canal. For section 11, five of the lowest tenders were in this order: \$278,812, \$281,740, \$183,479, \$289,649, \$262,865. For section 12, six of the lowest tenders were as follows: \$234,561, \$235,218, \$239,342, \$240,990, \$244,000. For section 13, several of the lowest tenders ranged as follows: \$532,129, \$552,629, \$556,537, \$559,695. These figures indicate that a more business-like method of esti-

matings prevail among contractors for public works than among building contractors, by which results much more accurate are secured by the former than are usually achieved by the latter.

A GREAT deal of well-merited praise has been bestowed upon the St. Clair tunnel as a type of modern engineering skill. The important feature of ventilation, however, appears not to have been successfully worked out. A suit for \$75,000 damages is now pending against the Tunnel Co., the plaintiff being the widow of a brakeman named Hawthorne, who died from suffocation while the train on which he was working was passing through the tunnel. It appears that the train parted in the middle while in the tunnel. Hawthorne was on the rear part and was suffocated before assistance reached him. The company is said to be considering the question of using electric cars in the tunnel.

THE first prosecution under the new scaffold by-law of the city of Toronto, took place during last month. The prosecutor was the city Building Inspector, and the defendant, Mr. James Hill, a Cleveland contractor who is building a brick chimney stack one hundred and seventy-five feet high for the Toronto Street Railway Co. Mr. Hill contended that his men were perfectly satisfied with the scaffold, and further, that the most dangerous part of the work had been completed, but the magistrate refused to allow him to proceed until the scaffold was re-constructed from the bottom up in accordance with the requirements of the by-law. For the information of builders who may not be familiar therewith, we print elsewhere in this issue the provisions of the law.

A PROPOSAL has been introduced by Alderman Lamb in the Toronto Council for improving the present market accommodation. The suggestion is that an architectural competition be instituted for the purpose of procuring designs for the alteration of the present St. Lawrence market. It has likewise been suggested that it would be desirable to erect new buildings on the esplanade, convenient to the proposed Union railway depot and the steamboat landing. The latter proposal is one well worth considering. The lake front would be almost as convenient of access as the present location, and unless the present buildings can be so altered as to provide all necessary accommodation for the next fifteen or twenty years, it would be more satisfactory to erect new ones.

The recent outbreak of diphtheria in one of the choicest residential districts of Toronto, has drawn attention to the foul condition of the sewers as being the most probable source from which the disease could emanate. It does not appear to be a rule of the city service that the sewers must be flushed at regular intervals; consequently it is left to the rain to cleanse them, and there having been but little rain for a month or two past, they have become the receptacle for all manner of filth. This condition of affairs, bad enough in itself, is accentuated by the fact that the only means in use for the ventilation of sewers are the gratings in the manholes in the centre of the street and on a level with the pavement. From these manholes there is being constantly emitted into the atmosphere the poisonous gases engendered by the foul contents of the sewers. It is quite true that some proper method of ventilating the sewers was adopted. It would be a comparatively easy matter to place in inconspicuous positions a sufficient number of ventilating shafts for this purpose.

A railroad man in Broad Street Station, Philadelphia, recently said that the Pennsylvania Railroad Co. have for years been looking for something to take the place of glass for use in glazing the station roofs and for similar positions. He said that the heat and smoke given off by the engines, added to the vibration caused by moving trains, has the effect of breaking the glass, however well it is bedded. The cost of putting in new glass always is considerable because of its high position and the difficulty of getting at it, but that is nothing to the expense that would be sure to come should a piece of cracked glass fall and injure a passenger. Railroads have not only to buy the best because of economy, but have always staring them in the face possible suits for damages. What is required is some sort of a glass having imbedded in it a steel wire mesh so that should the

glass crack the wire will hold the pieces up. A paragraph in a foreign paper states that a material of this kind has lately been put on the market in Germany. It is, however, only made in small sheets, and is therefore practically useless.

A correspondent of the *Montreal Gazette*, writing from St. Johns, Nfld., takes a sombre view of the future of that city. He points to the fact that the value of property destroyed in the recent conflagration amounts to upwards of \$20,000,000, while the total sum paid in insurance reaches only \$4,800,000, leaving the community poorer by \$15,000,000. "One cannot but smile," says this writer, "at the shallow, optimistic views propounded by some here, who have little insight into the reality of matters. These talk flippantly of building up at once a fine city far superior to the former; and even hint airily that the fire is rather a good thing, and that we will soon be in a better position than ever. It is well to be hopeful, but to indulge in childish fancies and hug illusions can do no good. The expenditure in work, and the increased employment given will create a temporary boom and seeming prosperity; but our capital is diminished, our houses, public buildings, educational establishments, halls, etc., have to be restored, and all this implies hard work continued through years. We have to go back fifteen or twenty years, and like a colony of beavers whose dam has been swept away by a flood, begin the work afresh. The beavers are not jubilant or jaunty over the flood that has broken up their homes and destroyed their labors, but quietly go to work and grimly face the disagreeable facts of existence as part of the ordinary course of nature. Our shallow-pated optimists, who are generally non-workers and only talkers, void of all practical talent, had better 'consume their own smoke.' Their idle chatter only irritates the real workers."

It is stated on the best authority to be the intention of the Montreal Street Railway Company to extend its lines as fast as possible to the outlying districts, with the object of attracting population from the crowded central parts of the city, to build up the suburbs and increase the street car traffic. Such a policy would no doubt result profitably to the company and would be the means of greatly improving the appearance of the city as well as the conditions of residence therein. In this connection we quote with approval the following from an editorial article which recently appeared in the columns of the *Montreal Gazette*:—"The Quebec order of domestic architecture runs to terraces. A man's lot is twenty-five feet front running to a lane in rear which is too often the common receptacle for all the refuse of the abutting proprietors' dwellings. His end wall, like his lane, is common to his neighbor. This fashion of crowding may be a survival from the days the towns had walls to keep out the Indians and intra-mural space was too valuable to waste in gardens. The fact that the area of the city was small also no doubt tended to strengthen the traditional style, which had a further excuse in the desire of the people to live as near their places of business as possible, owing to the poor means of transport available. The house-building ways of Montrealers have also been copied by their suburban neighbors, even when there was no excuse in the dearth of the land occupied. The result is that Montreal and its offshoots present one of the most densely populated areas, outside of New York city, on the continent. The city would be healthier as well as more attractive and home-like, if there was greater individuality in the citizens' residences—if families lived in houses, instead of being domiciled in sections of a block. It is unfortunate that the era of suburban development now promised from the modernizing of the street car service, does not also promise all that is desirable in the way of a change. Farms miles out in the country have been surveyed and sold on the 25-foot plan, and, because the people do not think for themselves, the vendors have met with a success that was hardly anticipated. The process of emancipation from the old rule may evidently be slow unless some real estate man, more keen than his rivals, sets the example that once seen will be appreciated. There is such a thing as costly economy in house building, and Montrealers illustrate one phase of it when they sacrifice individuality, homelikeness, healthfulness and appearance for the sake of half the cost of a dividing wall."

THE CANADIAN ARCHITECT AND BUILDER, \$2 per year.

ILLUSTRATIONS.

RESIDENCE OF MR. J. L. MORRISON, CORNER WINCHESTER AND METCALFE STREETS, TORONTO.—J. WILSON GRAY, ARCHITECT, TORONTO.

THE PLENUM SYSTEM OF VENTILATION, ILLUSTRATING PAPER BY MR. A. C. HUTCHISON.

COTTAGE FOR MR. A. F. LOBB, TORONTO.—E. J. LENNOX, ARCHITECT, TORONTO.

COTTAGE ON AUSTIN AVENUE, TORONTO, FOR MR. WALTER DAVIDSON.—J. FRANCIS BROWN, ARCHITECT, TORONTO.

LAKESIDE ROAD COTTAGES.—J. FRANCIS BROWN, ARCHITECT, TORONTO.

ARCHITECTS' FEES.

CHARLOTTETOWN, P. E. I., Oct. 28, 1892.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—I would be glad if you could answer the following questions in the next number of the CANADIAN ARCHITECT AND BUILDER :—

What is a fair charge by percentage for preliminary drawings (plans and elevations) specifications and estimates of proposed alterations and repairs to a large public building built of free stone? The building was erected about 50 years ago and is in a very bad condition, parts of the work being almost dangerous. There was included in the preliminary work a careful report upon the present condition of the building, and the cost was figured at \$18,000. The work, however, was never carried out.

Yours truly,

C. B. CHAPPELL.

[The charge for full professional services for a public building is 5% of the cost of the building when completed. In case of the abandonment of the work, the commission is calculated from the estimated cost of the building, and is for the degrees of partial service as follows :—

1. Preliminary studies, 1/5 of the full commission as above.
2. Preliminary studies and general drawings and specifications sufficient for estimate and contract, 1/2 of the full commission as above.
3. Preliminary studies, general drawings, specifications and details, 4/5 of the full commission as above.

For the alteration of premises a charge in excess of the above is made for surveying, measuring and plotting an existing building, and for such other extra work as may arise in the preparation for or supervision of alterations. This charge is based upon the time occupied.—EDITOR C. A. & B.]

A REPLY TO "DORIC."

HAMILTON, Oct. 22nd, 1892.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—In reference to "Doric's" letter in your last issue, I must say there was no intention on my part to injure anyone's reputation; such an idea never entered my head. The two buildings referred to have been the principal jobs here this season, and I simply criticized the carving as a matter of course; as far as that goes, I strongly reiterate what was said in the notes, and feel quite satisfied that competent judges would do the same.

"Doric" says: "No carving was done on Mr. Tuckett's residence until the 15th of September, several days after your valuable journal reached me." The ARCHITECT AND BUILDER was not published till Saturday, September 17th, and, as you know, the notes were in your possession at least one month before that date. At the time these were written I positively state a large amount of the carving on Mr. Tuckett's residence was not only started, but very nearly finished, if not quite; there has been nightly little done on some of it since then.

As far as the drawing referred to is concerned, I had not the slightest idea that the sculptor had laughed at or in any way criticized it till reading "Doric's" letter; it quite surprised me. I contend, however that there is nothing crude or impracticable in it, and am quite ready to have my copy of the drawing inspected. The idea is certainly somewhat new, and doubtless it was reluctance to leave the rut of old ideas that caused the sculptor's hilarious criticism.

In conclusion let me say, that although this sculptor may have done highly artistic work on many other buildings in

Canada, it does not in the least alter the present case; in fact it is more to his discredit that this work should have been turned out.

I am, yours faithfully,

C. H. ACTON BOND.

THE O. A. A.

November 5, 1892.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—What has become of the Ontario Association of Architects to which I have paid a subscription for two or three past years. We in the country look anxiously in the CANADIAN ARCHITECT AND BUILDER for some signs of its existence, but month after month goes by and we begin to think it is dead. Surely for an Association of such importance to the Province, we, the members, might expect to hear something between the annual meetings, but now we never even see any reports of board or Council meetings, which used occasionally to appear. We have been waiting now for nearly two years to see the results of Mr. Townsend's investigations and experiments on the building stones of the Province, which Mr. Curry recently stated was of decided value to architects, and naturally we should like to know whether any progress is being made towards the erasure of the word "Registered" from the Act. I see in a speech of Mr. Curry's at the meeting of the Province of Quebec Association that the work of the Ontario Association has apparently dwindled to the training of students, and that he expects we should all pay for this laudable object, and he infers that he does not want men to be in the Association who are not willing to do this without expecting to receive benefits. I think we all joined the Association under the notion that it was to be for some rather more general good to the profession than that, and personally I do not see the advantage of remaining a member for the sole purpose of educating young fellows in Toronto.

The Quebec Association has hit upon an excellent idea, that of monthly meetings of the members in town. Now, if the city members would meet monthly, read and discuss papers and have the papers and discussions published for the use of country members, we should certainly be benefited. It seems to me that the policy of our Council is to keep quiet—why, I do not know, unless it is that they fear to excite opposition, but I would remind them that opposition is generally very beneficial, and in this case would certainly rouse us to do something for the Association in the way of helping against contrary influences, whereas now we are gradually losing all interest.

Now that the Association has shown us that some communication between the architects of the Province is a good thing, I for one would certainly like this communication to be kept up, and if the Association cannot do it except for two days or so in each year, there is certainly room for some other organization, at any rate for the use of country members.

Mr. Curry says that the Toronto Architectural Guild dine together once a month or so and discuss matters of professional interest. He says that the Guild is very exclusive, by which I conclude he means that it is composed of probably the members of the Council who happen to live in Toronto and other members of the profession who have large practices. Now, most of these, if not all, must be members of the O. A. A.; then why, if they can meet and talk together as a Guild, can they not do so as the Association and let us outsiders have the benefit of their discussions? I would gladly subscribe that they may dine together if they would only do this for me in return.

I do not wish to put myself forward as the mouth-piece of country members, but I feel sure they must all feel pretty much as I do, and it would be a good thing for us all if others would write to you their feelings in the matter.

I suppose there is to be a convention next February, and I have no doubt that the city members will do their best to make the country members welcome, and I do not forget how well they have entertained us, but pleasure apart from the meetings of the convention, will do us from the country very little real good. I understand now since Mr. Curry's visit to Montreal that we are very selfish to expect any good; we ought to come up in flocks or droves to benefit the students, but unhappily I cannot afford to do that, and I am afraid I must confess to being one who puts his "personal business" before the training of the youths.

Apologizing for the length of my letter, I am yours truly,

A COUNTRY MEMBER.



Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—Will you kindly allow me space in your columns to draw the attention of the architects of Toronto to the work of the Toronto Architectural Club? It has been felt by the committee that some special effort must be made this year to augment the membership, and that a better understanding of its aims and objects might accomplish this end. This seems especially desirable as the club commences this session in new quarters, under a new name, and I may add with new and higher aspirations.

In a city the size of Toronto it requires the active co-operation of every member of the profession to make such an organization the success it deserves to be. To those who have not had the privilege of attending its meetings in the past, it might be said that the importance and interest of the papers read have been of such an order as to place the Club on an equal footing with other architectural associations not only of this country, but also with those of the United States and of England.

Owing to the fact that during last season classes were conducted for the benefit of students under its auspices, the impression may have been formed that it is merely a students' club. This of course is not the case.

A series of papers and lectures, interspersed with exhibitions, socials, etc., is being arranged for the winter's programme, which will be of undoubted merit. It is then asked that the efforts of the officers and the labours of those who prepare the papers may be backed by the regular attendance not only of the architects of the city, but also of their students, and of that large class which is, in a non-professional way, interested in the advancement of art and architecture in our country.

The meetings are held fortnightly, in "The Forum" on the south-east corner of Yonge and Gerrard streets. At the next meeting, which will be held on Monday evening, Nov. 21st, Mr. J. Wilson Gray will read a paper on "Glimpses of Chicago and the World's Fair Buildings." A hearty invitation is extended to all interested to be present that evening, and to have their names enrolled as members.

Yours truly,

A. H. GREGG,
President T. A. C.

THE INTERIOR OF A HOUSE.

The following paper on the above subject was read by Mr. C. H. Acton Bond, of Hamilton, at the meeting of the club on October 17th:—

It is a little difficult to know exactly where to begin in speaking of the interior of a house, as so much may be taken under this heading. The object of this paper, however, being to start a discussion, it will be as well to plunge right in and chance the consequences.

Whatever may be the size or cost of a house, its interior should suggest "A Home," and it is with this as an ultimate result always in view that I shall treat the subject. Of ordinary sized houses and those where a minimum of expenditure is allowed for the interior, very little will be said, as deductions can be made from the more elaborate schemes to suit these particular cases.

That portion of the interior of a house that comes under the supervision of the architect ordinarily includes the finish of doors, windows, walls, ceilings, floors, mantels, etc., and in considering these it will be necessary to speak of the various woods and their finishes, wall hangings and decorations, relief ornament, hardware, marble, tiles, grates, etc. Every apartment in the house should receive a distinctive and suggestive treatment according to its purpose, but there should yet be preserved a harmony throughout; that is, the contrast between adjoining rooms or halls should not be inharmonious, as this produces a very unpleasant effect and gives a feeling of unrest to the occupant. It will only be necessary to speak in detail of the principal rooms, as this will give a sufficient idea of the whole scheme. The general practice of treating the dining room rather heavier and in darker tones than the other rooms seems to be very appropriate; the serious business of eating is transacted here,

and the occupants are usually sitting and in a comparative state of rest. In the drawing room it is quite the reverse, and a much lighter treatment is suitable. The parlor or sitting room should have a treatment somewhat between; the reception room being chiefly devoted to social formalities, should receive a light and simple but dignified finish; there should not be much elaboration in the halls, and the tone ought to be rather subdued with a view to harmonize with the various rooms. The bed rooms generally should be finished in a light and cheerful manner. Special rooms, such as a billiard room or smoking room, would have to be finished very much according to the taste of the owner.

If a room is badly proportioned, it can be greatly improved by a little thought on the design of the finish, as the length, width or height can be strongly emphasized by lines in that direction. In designing the woodwork it is well to bear in mind the final completion of the scheme, so that it may have a look of unity. The main lines should be carried round unbroken as much as possible, and wherever features are introduced, such as cabinets or sideboards in a dado of panelling, they should work in with the general heights; it is a very difficult matter to apply successfully any scheme of decoration to a room in which this has been neglected.

If it is decided to finish a house in natural hardwood, some care will have to be given to its selection for the different rooms. Antique, English or quartered oak, walnut, rosewood, black ash and similar woods would do for the dining room, the lighter woods, such as bird's eye, curled or white maple, satin wood, sycamore, or white mahogany, being suitable for the drawing and reception rooms; in the sitting room, cherry, sycamore, gum-wood, white walnut, etc., could be used, and oak, cherry, or gum-wood, would be appropriate for the halls; in the bed room it would be better to choose from the lighter woods.

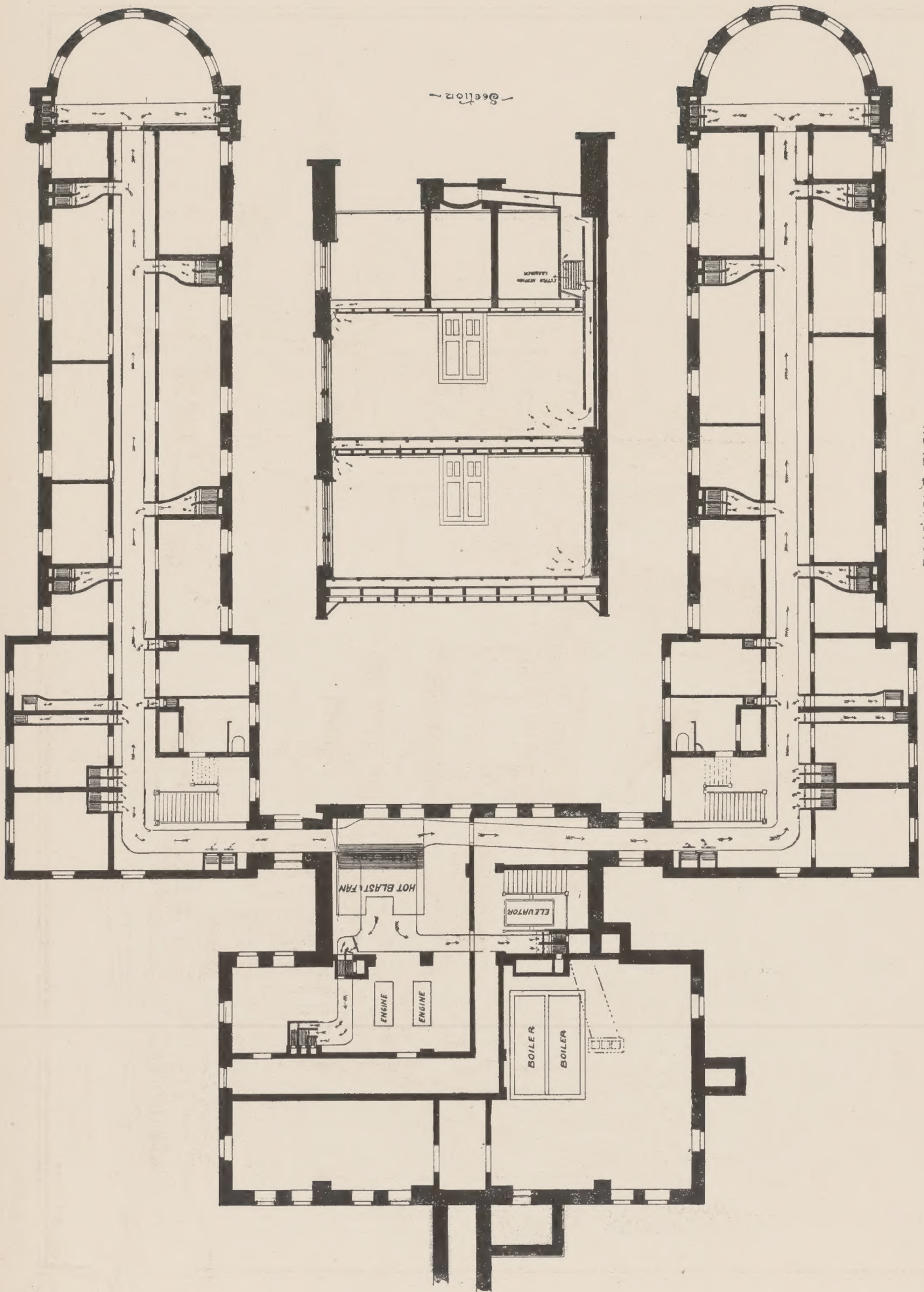
Of course, the hardwood finish should all be built up, as this gives the best results; it allows the wood to be better seasoned, and prevents cracking and warping. The veneer should be about $\frac{1}{4}$ inch thick, built on a thoroughly dry pine core made of small pieces well glued up. When the hardwood is being put up, the house should be well heated, as this will avoid to a great extent the opening of joints, etc., after the work is completed.

For the finished floors white oak is very suitable, as it is a good hard wood and looks well; maple, pitch pine or white pine would make a good floor for the kitchen apartments. The flooring should be in narrow widths and could be laid rectangularly across the room, diagonally or in simple patterns, with butt or mitre joints. Pattern floors of different woods tongued and grooved together or simply glued on a backing, are sold by a number of manufacturers. This is known as parquet work and would look very well in some halls. Care should be taken not to have too much variety in the pattern of the woods.

For vestibule or conservatory floors, encaustic tiles, mosaic work or rubber tiles would be more suitable than wood.

In finishing wood consideration should be given to its natural effect, and this should be followed as much as possible; for instance, red mahogany looks best with a highly polished surface, but oak looks best when finished dull. For all ordinary finishes hardwood should be well filled. Wheeler's is one of the standard patent fillers, but there are many good ones on the market. Some painters prefer to mix their own, and usually make them of corn starch, plaster of Paris and linseed oil. Coarse grained wood, such as oak, ought to have two coats of filler. A very satisfactory way of treating oak is to give it two coats of linseed oil after being filled and each coat rubbed down with beeswax and turpentine to a dull finish. For woods such as cherry, maple, sycamore, etc., two coats of hard oil varnish applied after being filled and each coat rubbed down with pumice stone and oil, will give a good result; for a highly polished surface, from four to six coats will be required according to the nature of the wood. For finishing natural pine, apply one coat of white shellac instead of the ordinary filler, and then finish with two or three coats of finishing varnish rubbed down at each coat.

Boiled oil is commonly used for painting on account of its drying qualities, but raw oil is more reliable and gives a better result in the end; lead paint should be used in preference to zinc as the latter shrinks and creases. The hardwood floors should be filled and finished with Butcher's or some other reli-

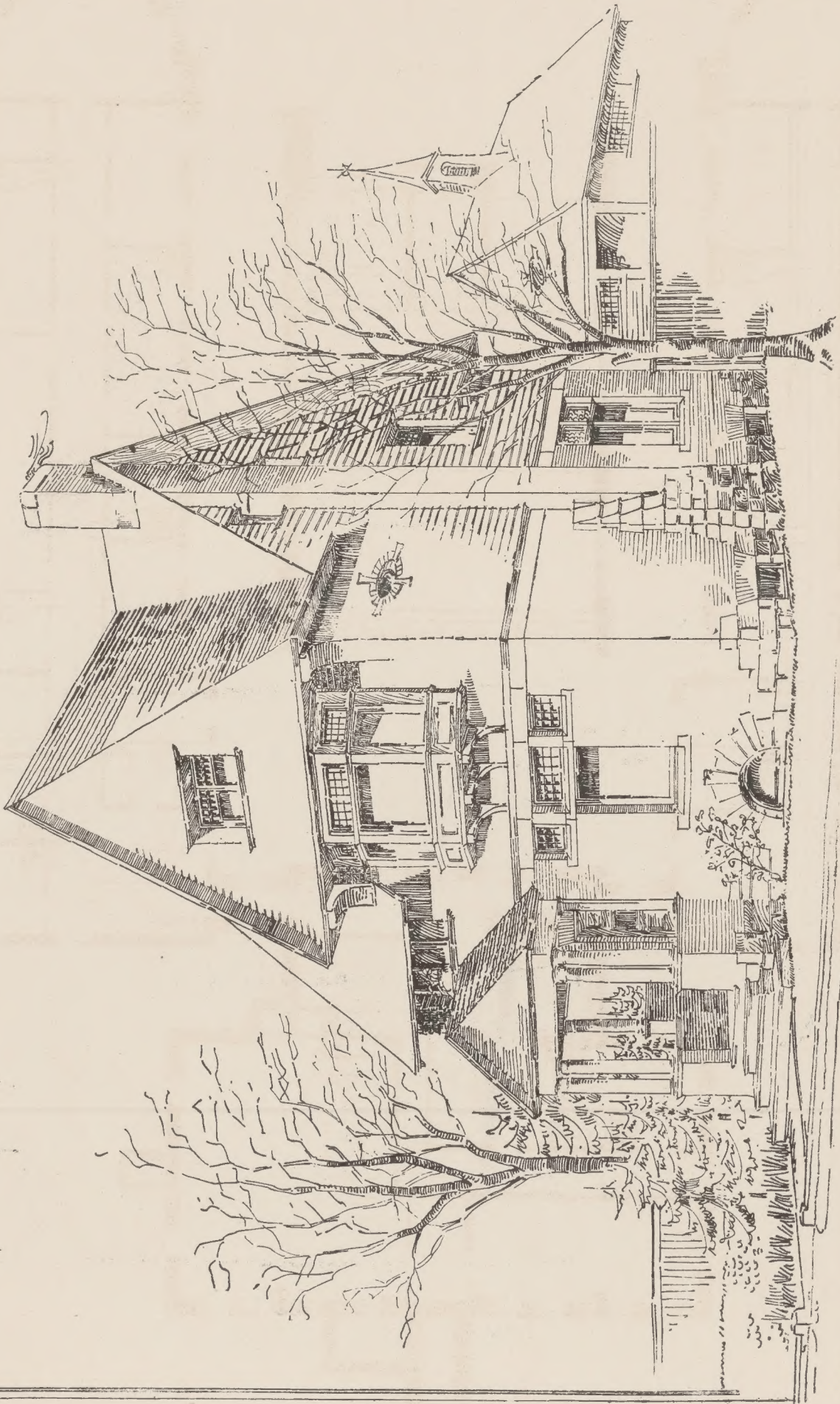


BASEMENT PLAN

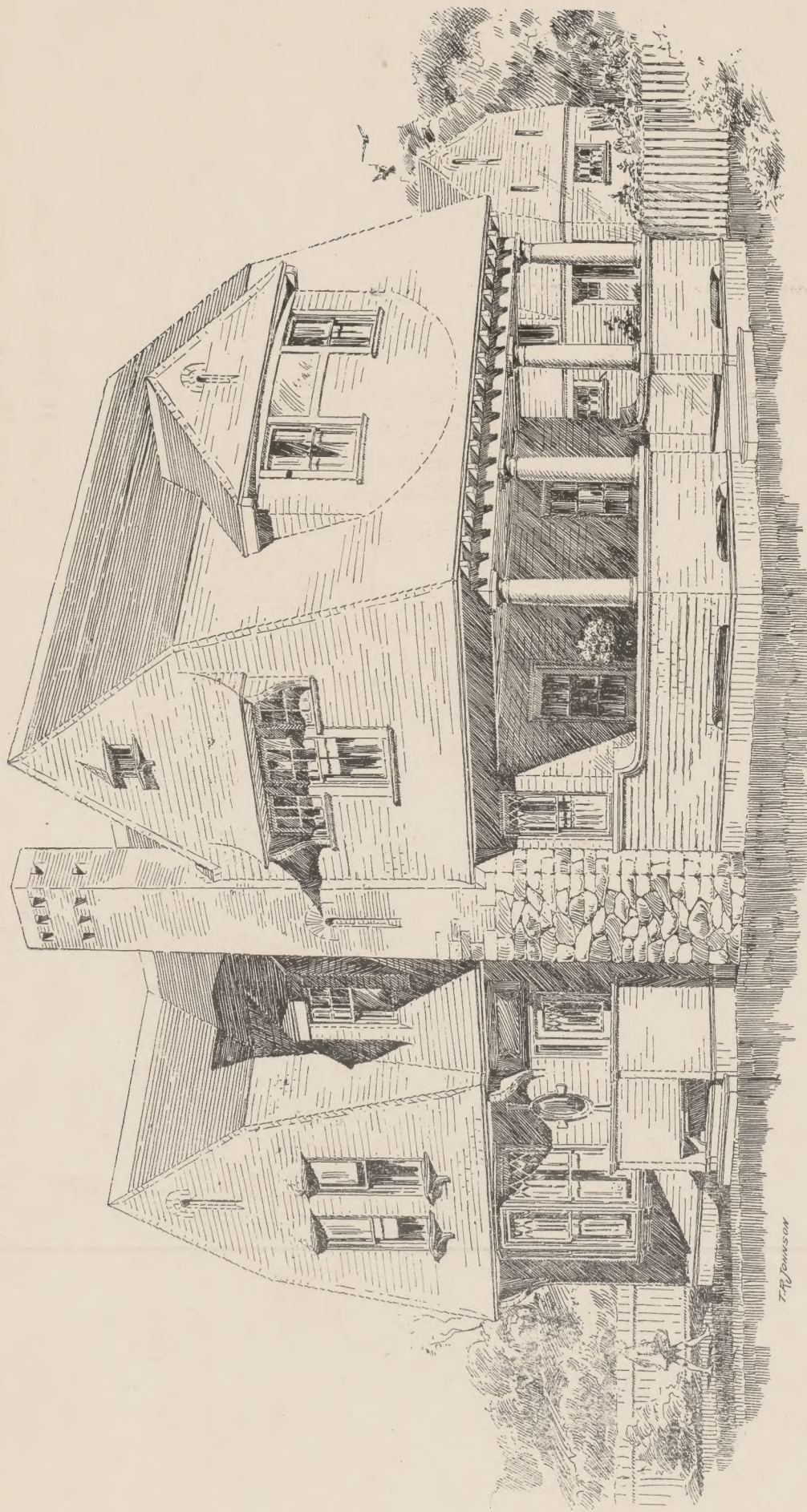
PLENUM SYSTEM OF VENTILATION.

ILLUSTRATING PAPER BY MR. A. C. HUTCHISON IN THIS NUMBER.

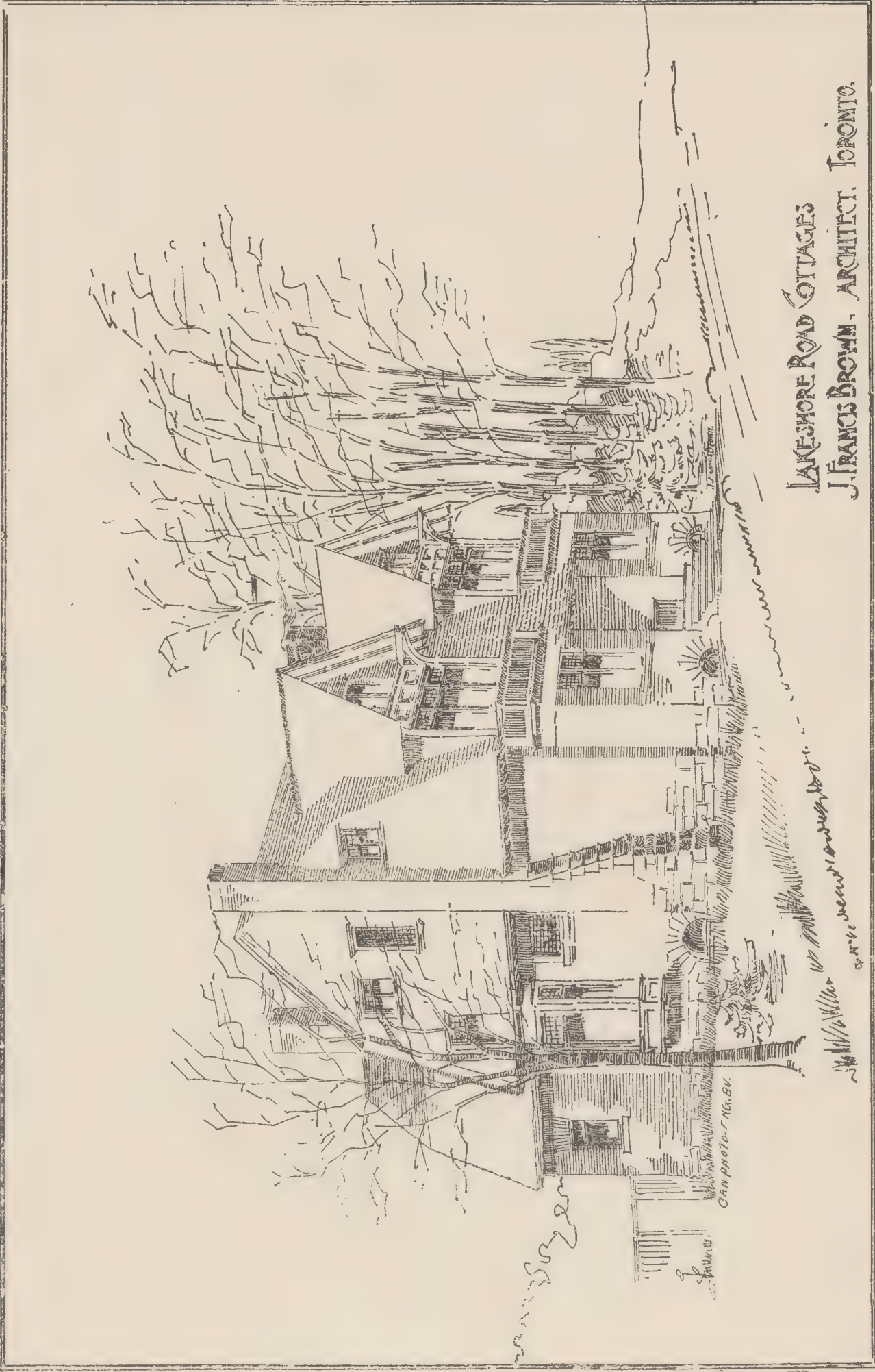
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COTTAGE FOR MR. A. F. LOBB, TORONTO.
E. J. LENNOX, ARCHITECT, TORONTO.





RESIDENCE OF MR. J. L. MORRISON, COR. WINCHESTER AND METCALFE STREETS, TORONTO.

J. WILSON GRAY, ARCHITECT, TORONTO.

able hard wax finish, or this may be done with beeswax and linseed oil.

There is such a variety of ways to treat a wall that it will be impossible now to speak of every method. The whole height may be finished in wood paneling, or the woodwork may just come high enough to form a dado; often it is nothing more than a base, and when this is so, the space above can be broken up in the decoration as dado filling and frieze, or just filling and frieze. Sometimes the frieze can be omitted with good effect, and the wall finished with small mouldings at ceiling or merged into ceiling without any break.

The most common wall decoration is wall paper, but of this not much will be said. It is produced with flat and relief patterns. Block, satin and mica or silk papers all give good effect. An excellent idea in wall papers has just been brought out in New York; it is known as the "Soudanese" pattern. In this the dominant color of the filling is carried into the dominant color of the ceiling; thus the frieze serves to interblend the wall and ceiling. Ingrain papers are now being used with patterns stencilled on after being hung. Good effects can be obtained if the colors are well chosen. Munro's ingrain papers are the best.

Besides wall papers there are many other hangings used for walls, such as tapestry, silk, embossed leather, Japanese leather, Lincrusta-Walton, anaglypta, stereo-relief, lignomur and a number of others. Japanese leather is a relief hanging decorated by bronzes and gold by the manufacturers in antique effects; it makes a very suitable filling for a dining room where there is a dado of oak. Lincrusta-Walton is a composition relief material, stamped; the relief work is very sharp and clean, but has rather a precise effect; it can be painted or decorated to taste. Anaglypta is another stamped relief material; it is not so sharp in its relief as Lincrusta, but has more of a modelled effect. Stereo-relief is a fire-proof composition hanging, cast in flexible moulds; it can be obtained in both high and low relief and with a perfect undercut; from the process of its manufacture the stiffness and preciseness of stamped hangings is avoided, and a free artistic effect is gained. Lignomur is composed of chemical wood fibre in bold relief; it can be painted, stained or varnished just as if it were natural wood.

The ways of decorating walls without hangings are just as numerous as the many varieties of hangings in existence and it will be impossible to speak of them all now, as this alone would require a whole evening. They may be painted in many ways and left either plain, with stencilled ornaments, or frescoed; if the plaster is stucco finished, an effective way is to gradate the color, and if consideration is given to the way the light comes into the room, beautiful results can be got. Immense color combinations can be got by studying the tints on autumn leaves; the harmony on them is perfect and the tints are so varied that the scope of their application is unlimited.

Linspar is a mineral composition for decorating walls and ceilings; it can be used as a stucco finish, combed or brought out in relief, and is well adapted to modelling ornament. Some painters get the same effect with a composition of their own; it is then usually known as plastico; papier mache and other relief ornaments can be worked in with it and the whole decorated as desired. An effective way to decorate relief hangings, such as lincrusta, anaglypta, etc., is to paint them, rub verdigris into the hollow, and then apply gold leaf by a roller or pad; this will just catch the high lights and accentuate the relief; the result is an antique effect and looks immense. Whistler, the American artist, obtained a striking effect in a small room by a very novel method; he painted the walls a pure black and then overlaid this with a semi-transparent yellow; the result was a misty foggy look, and the room appeared to be much larger.

Rooms treated in the Adams or Rococco styles may be finished in white or ivory enamel, picked out with gold or silver; for the very best work of this kind the wood should be of cherry, as it is so close grained and hard; the next best wood for the purpose is white wood or poplar. The wood should first be filled, then given two or three coats of white lead paint and finished with two coats of enamel, rubbed down at each coat. The white lead paint is put on to give a body to the work. Plaster should receive a coat of white shellac instead of being filled and then about four coats of white lead; after this the enamel is applied as on the woodwork. Patent enamel may be used, but, if pre-

ferred, it can be made with zinc white and light hard oil varnish. Zinc white is used in preference to lead in the last coats, as it is a purer white, but would not do for the foundation on account of its shrinking quality. Silk hangings can be panelled or draped all around the room either with a frieze of other materials or of silk festooned and caught up with relief ornament, having swags of cord and tassels. This of course does not include every way of treating walls—for instance, they could be kalsomined or—whitewashed!!

Ceilings may be tinted, papered, panelled or finished in relief work. Heavy oak beams and cross beams make an excellent dining room ceiling; the panels could be filled with relief hangings, modelled plaster or stucco work, which would look well if tinted a rich brown and broad plays of lights introduced in it from the direction of the windows by chromos and vandykes. Ceilings of plaster ribs and modelling give great scope to the decorator, as also do ceilings having stereo-relief or carton-pierre ornament. Ceilings can also be painted in oils or water color. Alabastine is a patent water color preparation which can be obtained in delicate tints and gives good results.

The mantels should be of similar finish to that of the room, and grates and hearths chosen with a view to the general harmony. An open fireplace having an enamelled cream color tile backing, hearth of similar tiles with Mexican onyx border and facing of Mexican onyx, with simple oxidized brass edging frame would be very suitable in a room finished in ivory enamel. Enamel tiles are preferable to glazed where delicacy of tint is required, such as would be in this case. Briquette tiles should be used for backings, as the flat tiles are liable to be cracked off by the heat. Care should always be taken to proportion the hearth, both in size and color, to the rest of the work. Bronzed relief linings look well with the darker woods. Enamelled and ordinary pressed bricks can be used for both fire places and mantels. With the Roman, Carthaginian and moulded bricks now made, great variety in design can be obtained. Other materials, such as stone, marble and slate, are used for mantels, and in England cast iron is largely used, painted to correspond with the room.

Hardware is a subject which should be taken up separately, but as this forms part of a complete whole, something must be said about it. This, as every other part, should be chosen with regard to the ultimate effect. Furniture can be obtained either plain or ornamented, and in a great number of finishes, such as plain brass, bronze, nickel plate, silver plate and gold plate. Most of these finishes have sub-finishes; for instance, oxidized effects and matching one finish with another. Iron is finished effectively by the Bower-Barff process which converts the surface of the metal into magnetic oxide of iron and makes it absolutely rustless; this is very appropriate for halls and rooms finished in oak.

In a large house it is well not to carry the same finish all through, but consider the effect of the different rooms. A drawing room finished in enamel and gold would look well with gold plated furniture, and so on. Of course, it would not be well to get too much variety this way, and a little care must be exercised. A look of completeness is given to the work if attention is paid to small details, such as finishing that portion of a butt hinge which shows inside a room to correspond with the hall; the heads of window head screws should also have the same finish as furniture of room.

In conclusion, it is only necessary to repeat that everything should be designed and selected with regard to the whole effect, and if this is done we ought to have as a result, a thoroughly artistic and satisfactory home.

PUBLICATIONS.

WE have been favored by the Secretary with the R. I. B. A. Kalendar for 1892-93, which we find to be quite as instructive as usual.

Mrs. Schuyler Van Rensselaer's papers on the great English Cathedrals, which have been appearing in *The Century Magazine* for some years, have at length been issued in book form, making a handsome, royal octavo volume of 400 pages. These articles which have been written by an amateur for amateurs, have been carefully revised by the author and greatly augmented, and with the splendid illustrations by Joseph Pennell—154 in number—present a vivid panorama of St. Pauls, Canterbury, York, Wells and the other great Cathedral churches of England. The book, considered either from an historical or a critical standpoint, is a valuable addition to ecclesiastical literature. Published by The Century Co., New York. Price \$6.00.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A CITY HOUSE.

THE CANADIAN ARCHITECT AND BUILDER invites competitive designs for a city dwelling, to cost \$15,000, and to be erected on a lot 30x125 feet. The lot will face the narrow way, south, the longway, east. The main west wall of the building must stand on the party line between the lots, and the main east wall must come upon the street line. There is to be no enclosed area for lighting.

The building is to contain three clear stories above ground, to be constructed of stone, or of stone and brick, with sloping or flat roof. No overhanging tile or shingle work will be allowed.

The entrance may be on either front, at the option of the designer.

The number and location of rooms and the purposes which they are to serve is left to the judgment of the designer.

Competitors will be required to furnish plans of basement and three upper stories, and elevations of south and east front. Perspectives may be submitted at the option of the competitors. Floor levels must be marked on tee side of the elevations.

This competition is restricted to architectural students and draughtsmen in Canada.

Drawings must be made on sheets of heavy white paper or bristol board, 14 x 20 inches in size, and must be drawn sufficiently coarse to allow of their being reduced to one-half the above size. Drawings must be made in *firm, strong lines*, with *pen and black ink*. No color or brush work will be allowed. Each drawing must be marked with the *nom de plume* of its author, and the author's name, *nom de plume* and full address, enclosed in a sealed envelope, must accompany each drawing sent in.

Drawings must reach the office of the CANADIAN ARCHITECT AND BUILDER, Confederation Life Building, Toronto, on or before the 4th of January, 1893. The right is reserved of publishing any drawing sent in. Drawings will be returned to their authors within a reasonable time after the competition is decided.

The first premium will be \$15.00, and the second, \$10.

The merits of the designs will be decided by a committee composed of three members of the Ontario Association of Architects, and their decision will be final.

COMPETITION FOR PUBLIC BUILDINGS AT VICTORIA, B. C.

The decision in the preliminary competition has just been announced. Out of sixty designs submitted the five exhibiting most merit are declared to be those by the following architects: J. Francis Brown, Toronto; Thomas C. Sorby, Victoria; F. M. Gardner, Chicago; W. J. Rattenbury, Vancouver; J. M. Connor, Boston; W. H. Skillings, Seattle, the last named two having joined on one design. We congratulate the Canadian architects upon the excellent showing they have made in this competition, and especially Mr. Brown, who has but recently commenced practice. It is to be hoped that a Canadian architect may succeed in winning first place in the final competition.

THE ERECTION OF SCAFFOLDS.

WE reprint below the by-law recently passed by the City Council of Toronto governing the erection of scaffolds:

All scaffolds used by bricklayers or other builders in the erection, repairing, altering or improving of buildings, chimneys or other structures, shall be built and constructed as follows:—

BUILDERS' SCAFFOLD.

Standards or uprights to be of live, sound Norway pine, tamarac or spruce (tamarac preferred). Distance between each standard eight or ten feet, and butts of said standard placed in the ground to the depth of not less than two feet six inches, and when placed upon stone flagging or granolithic sidewalk, to be put in good sound cement or other barrel, or a box two feet square by two feet six inches high, and filled with sand or other suitable material. The standards to be not less than four and half inches at butt, and two and a half inches at the top diameter, and in a very high scaffold, to be increased in size.

Ledgers same material as standards, not less than three inches diameter, at small end, and no ledger to be taken off the standards that would allow a greater distance from the ground than ten feet. Putlogs to be of iron-wood, white oak, or other suitable material, the said putlogs to be butted, flattened or squared at the end which enters the wall, and not to be removed according as the scaffold rises. One course of planking, the entire length of scaffold, must remain on each tier of the said putlogs. The putlogs not to be less than three inches diameter clear of bark. Three putlogs to be placed under planks twelve feet in length, that is to say, one putlog at each

end and one in the centre. (When planks sixteen feet long are used five putlogs shall be used.) Planks to be two inches in thickness, and of sound pine, spruce or hemlock, ten or twelve inches in width.

Scaffolds to be stayed from ledgers on to the joists through the openings, and in the absence of openings, to be stayed by other sufficient means.

Racking braces to consist of poles and tied with ropes. Ropes not to be less than sixteen feet in length, and five-eighths of an inch thick, except in case of small scaffolds, when rope one half inch thick may be used.

Ladders in all cases to reach five feet above the landing stage, so that plenty of hold will be afforded men when landing off.

When bricks are laid from the inside of fire-proof buildings, there shall be a temporary floor of two-inch plank laid on the girders or temporary joists all around the inside of walls and not less than six feet wide, and when bricks are laid from the inside of buildings not fire proof, which have joists not over fourteen inches apart, then the temporary floor may be of one-inch boards six feet wide and placed all around the building.

In all cases where the inside scaffolding is built from the foundation the same as the outside scaffolding, the temporary floors above mentioned shall not be required.

When trestles are used, the height to be from four to six feet and to be made substantial, of good material, and when a scaffold is formed by putting trestles one upon another it shall not be over eighteen feet in height, that is to say, not more than three trestles shall be used of the height of six feet each.

Where required all overhead protections to be placed fully under scaffolds. When building out to the street line, boards or planks to be placed where the workmen pass under.

All scaffolding used by carpenters, in the erection, repairing, altering or improving of buildings, chimneys or other structures, shall be built and constructed as follows:—

CARPENTERS' SCAFFOLDING.

All uprights of said scaffolding to be 4 x 4, sound and free from objectionable knots, the brackets nailed to them and to the building, and to be one inch in thickness and not less than ten inches wide, properly nailed to building and upright; and when there is no opening to nail said bracket, then a piece one inch thick and six inches wide to be notched to secure the bracket, and nailed solid to the wall and to the upright. The boards laid on this to walk on to be two-inch plank, sound and free from knots, or else two one-inch boards, laid one on top of the other.

When bracket scaffold is put up, the leg to be sound and not less than 2 x 6 on edge, set at the proper angle to prevent the bracket from tipping from the wall.

When scaffold projects from windows, the bracket to be one inch thick by not less than ten inches wide and six inches deep, both brace and bracket well nailed to window, and the brace well nailed to bracket also.

The City Commissioner shall forthwith after he has approved of the plans of buildings proposed to be erected, as required by Section 32 of By-law 2468, see that the scaffolding used in the construction of such building shall conform with the foregoing provisions of this By-law, and prosecute all persons who may proceed with the erection of buildings using scaffolding which is not constructed in accordance with this By-law, and in the event of the City Commissioner finding a scaffold, which in his estimation is unsafe, and after due notice to the contractor, the same is not made satisfactory, the said Commissioner may take such proceedings against him as he has power under this or any other By-law.

Any person convicted of a breach of any of the provisions of this By-law shall forfeit and pay, at the discretion of the convicting magistrate, a penalty not exceeding the sum of fifty dollars for each offence, exclusive of costs.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER).

The Building Inspector wishes to secure the amendment of the by-law governing the erection of fire escapes, so as to bring the owners of large boarding houses under its provisions.

It is understood to be the intention of the newly appointed Sanitary Engineer to endeavor to secure the adoption by the Council of a by-law to provide for the regulation of plumbers and plumbing.

The death of Mr. Geo. H. Mount, who for nine years filled the position of assistant to Mr. Lacroix, the City Building Inspector, took place at St. Hyacinthe last month.

The sum of \$20,000 has been subscribed for the erection of a monument to the late Sir John A. Macdonald. The committee, representing the citizens, which has in hand the erection of the monument, will proceed at once to collect the subscriptions. A number of sculptors, foreign and Canadian, have been asked to submit designs.

Mr. Douglas Sladen gives the following description of the old cathedral of Notre Dame at Montreal, in a letter to the New York Sun reporting the doings of the Duc d'Orleans and the Comte de Paris on the occasion of their visit to the city. "In America Montreal is the City of Churches, and the finest of them all is Notre Dome, rebuilt in 1824 on the site of the church of 1672, with towers 227 feet high, and a good deal of the majestic appearance of St. Sulpice, of Paris. The Seigneurs of the island of Montreal are the Fathers of St. Sulpice. Inside, no church on this continent so recalls the carving and color and richness of mediæval Catholic churches, like the roof of Ely Cathedral, or the wood screens of Totnes and Dartmouth. There are many suggestions of Dartmouth in the interior. One must examine it in a subdued light, or not too closely, for its ornamentation bears the same relation to the solid richness of mediæval work as Japanese goods

prepared for Western markets bear, to the genuine old Japanese, made for some great Daimo, and sold and resold, until they arrive at the stall of the curio seller. The galleries have very handsome wooden arcading, and there is a great deal of carving about the reredos and the pulpit and elsewhere, but the effect is the effect of things that would be poor without paint—not of painted oak. Though it will not bear critical examination from an eye accustomed to the work done when the monks were their own masons and carpenters, the whole effect is rich and singularly harmonious and spirited. This great church will seat from ten to fifteen thousand people.

A commission composed of Mr. H. Wallis, Mechanical Superintendent of the G. T. Railway, Mr. Howden, Government Inspector of Dredging, and a third party yet to be named, has been appointed to inspect and report on the work done in Montreal harbor during the past year.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

As might be expected there is not very much work going on just now, but for this season of the year the outlook is not bad.

Architect Clohecy is making alterations to the Loretto Convent, which will cost about \$10,000.

Extensive alterations will be made to Christ Church Cathedral Sunday School by Architect Mills who has just completed the Zion Tabernacle Sunday School.

A residence to cost about \$10,000 is to be erected by Architect Balfour on James street south for Mr. C. M. Counsell.

Messrs Lawry & Son are making important alterations and additions to their pork factory on Wentworth street under the direction of Architect Balfour.

A large addition will be made to the Hamilton Pottery by Architect Mills.

Architect Balfour is making additions to Gomp's brewery and also to the Grant-Lottridge brewery.

Architect Stewart is putting up a residence on Hughson street.

A hotel is being erected on top of the Mountain, in the east end, where it is intended to construct another incline railway.

The intersection of John and King streets has been selected as the site of the proposed monument to the late Sir John A. Macdonald. The base is now in course of erection. The statue itself is expected to arrive shortly from England.

Carving in this city seems to receive very little attention from the architects, and the result is in the majority of cases that the building would look better if it were left off; on the recently completed Bank of Hamilton, however, the carving is very successful; it is well designed and well executed; on the City Hall the execution of the carving is good, generally speaking, but in some places the design is not at all up to the standard; one of the panels on the main tower is particularly bad. On the Public Library the carving is entirely devoid of artistic merit, and it seems a pity that on a building of this character such should be the case. On the Canada Life building the carving is very good, and not only improves the building, but is a credit both to the architect and sculptor.

A joke is going the rounds at the expense of the watchful guardians of the peace in Hamilton. A well known plumber and two of his assistants found it necessary to work all night in repairing some pipes in a store. They were discovered by the police, who mistaking them for burglars, quietly surrounded the house and had a patrol wagon in waiting to receive them. When their identity became known, the representatives of law and order retired with as much dignity as the circumstances would permit.

THE ARCHITECT AS A BUSINESS MAN AND ARTIST.*

By J. R. RHIND.

The architect must be, first, a business man, second, practical, and third, artistic. Is is of the last I have most to say.

The first is necessary to the drawing up of agreements, and conducting and negotiating for the carrying out of work, so that extras or omissions, should any occur, may be settled in a fair and just manner, and so that the employer may be protected from any loss by the failure of the builder to fulfil his contract. The want or lack of a business way of settling work, drawing up agreements and specifications, or badly drawn and insufficiently illustrated plans, are primary causes of misunderstanding and disagreement, lead to litigation, entailing serious loss of time and giving much worry and trouble—and worry will kill a man in half the time that hard work will—and making one ask the question: "Is life worth living?" I would certainly answer, "Not the life of an unbusinesslike architect." Business capacity will come by experience, though sometimes dearly and bitterly bought, and wise is the man who takes his mistakes in a right spirit and avoids the sunken rocks and treacherous under currents which he will surely meet, as every one of us here has no doubt done, who steers his business affairs by the light of his past experience, and guided by common sense, carefully avoids past mistakes and blunders.

There is, as you all of course well know, great differences in clients; with some clients from the first moment you put pencil to paper to the last stroke of the pen as you sign your name to the cheque in payment of your services, it has been a series of successes; everything you do is appreciated; this gives zest and pleasure to your work; you feel inspired as you design; you strike out good and original ideas; your suggestions are approved of and carried out. With a client of this kind you invariably get the pick of the contractors (a good contractor is more than half the battle) to carry out the work well and quickly, and when you are finally and promptly paid you sign your name to your cheque with an extra flourish and dash, and feel that though easily earned, you gave good value for your money.

But the other kind of client, who first bargains what you are to be paid and who thinks your charges exorbitant, you never seem to be able to please. After making innumerable drawings, your plan is at last decided on; you call for tenders which of course come to far too much money; the plans are reduced and invariably spoiled, the work is cut down to the cheapest kind, the cheapest and nastiest contractors are given the work. The work goes on; your amiable client thinks it is not good enough and blames you; he begins to alter and add here and there, wants better inside finishing, better locks, better everything, till the bill of extras amounts to almost as much as the whole contract price; your client refuses point blank to pay, and if the poor unfortunate architect has not got every order for extra work in writing, he gets up one fine morning and finds that he has to attend that abomination of abominations, a court of law, to be questioned and cross-questioned by an "imp" of a lawyer, and is ready to declare to himself as he

wearily drags his limbs homeward, "Life is certainly not worth living."

These are the two extremes of the business part of the profession, and let us all pray that we may never meet the kind of client last described.

Next comes the practical part of the profession. The architect must know and use the most suitable material for the many different parts of his building, and proportion them to withstand the strains that will come upon them, in the strongest, most enduring and economical manner. This knowledge can to a certain extent be acquired by study alone and by being taught by another, but this is not sufficient, you must have practical experience, that is, the actual seeing of the work as it is carried out. When you make a mistake yourself or the builder makes a mistake, for the best of us are not infallible, then your inventive faculty in construction comes into play, and you are as it were "put on your mettle" and in rectifying your mistake you learn something which you did not know before and perhaps would never have learnt, unless you had blundered. Experience thus gained is one of the richest jewels in the architect's practice; it can only be obtained by experience, and wise is the man who humbly and thankfully stores this precious knowledge and who is able to bring it forth and apply his mayhap dearly bought, but rich experience, when occasion demands, and thereby successfully overcomes the difficulties in his way. But foolish is the man who does not profit by his experience. The pitfalls in his way are many, but he often discovers his calamities when they are brought about by his own pig-headed stupidity.

Now we come to the third, and to the architect the indispensable quality, viz., the Artistic—it is this quality which distinguishes the architect from the civil engineer, or mere builder. It is not bound by any rules that can be acquired and retained by memory ready to be fired off when occasion requires. One must have the artistic quality or he cannot design, it is like music, one must have an ear before he can distinguish one melody from another.

This artistic feeling is stronger and keener in some than in others; we cannot all be geniuses, but that should be no hindrance to our designing in good taste. We cannot all be Mozarts or Beethovens, but that is no reason why we should not enjoy the simplest melodies, or join in singing a chorus, or warble a song, though perhaps some of us in trying to warble might not add to what you would call "the concord of sweet sounds."

In short, one having an ear for music, it is possible to be trained to be a musician in the same way one having natural taste can be trained to design in good taste, by being told what is good and what is bad, and thus to be enabled himself to discriminate between good and bad, to have pointed out the difference between ornamental construction and constructed ornament; on this last hinges the whole question of good and bad architecture—one must construct first and then ornament the construction. One sees this ornamental construction brought to the highest point of beauty in the architecture of the middle ages, but when construction became the main object and the architect tried to see with what little support he could erect his buildings, they began to have an attenuated appearance, and though strong enough as time has proved, these buildings can never satisfy the artistic feelings within us; they look like what my countrymen would call "no very carny," and you feel a certain relief when you get a good distance away from them. Some of the principal qualities of good design are: the building must be strong and look strong, and to look strong, it must have strength and more than enough to set the mind at rest and satisfy you that it is, as the Yankees would say, "there to stay."

I do not mean to say that the stronger you make your building look the more satisfactory the effect. One is just as liable to err on the side of heaviness and clumsiness as attenuation and meagreness, but there is a just proportion between height and breadth and depth which the trained eye alone can discriminate and which never errs on the side of weakness.

To make a thorough good design one must not draw a pretty picture only and go no further, but must draw every particle of detail full size; the detail of a building goes more to show the well trained architect than the whole design; the general design may be good, and the detail being what you would call unarchitectural, it condemns the whole building; on the other hand the design may be meagre and the detail good, and thereby it retrieves the whole building and brings it into the sphere of good design.

This study of detail is one of the most interesting and absorbing in the profession of an architect, and the correct rendering of detail goes more to show the educated architect than any other point in a building.

The best way to study detail and design is from the actual building, not only to stand and look at it, but to measure and draw it, transfer it to your sketch book and make it your own, and you will discover as you draw fresh beauties which you did not before observe. I do not mean the buildings on this continent, but those of Europe. One to get the purest water must go to the fountain's head; in the same way one must study the works of the old masters.

If this Association is to attain to the highest degree of usefulness in the architectural profession in Canada and has at heart the raising of the profession to the highest and most respected position in the land, we must endeavor to do all in our power to this end. Let us begin with the training of our students who are the future architects of the Dominion, and determine that they shall have every opportunity and facility to gain a true and correct knowledge of architecture and the many branches of knowledge with which the architect of to day is familiar, especially the highest training of an artist in its broadest sense. Let us have a travelling studentship, to be won in competition, to enable the most capable of our students to enjoy the inestimable privilege of studying in Europe. I say privilege, because it does not matter how clever one may be, he is heavily handicapped in the race for excellence unless he studies in Europe the glorious works left to us by our fathers.

We are in a new country untrammelled by any school or manner of design; our requirements are different from any part of the States or Europe; we have more difficulties to contend with in the construction and design of our houses than any other country in the world; we have tropical heat and arctic cold, then let us make it our aim to make this architecture of Canada characteristic of Canada. The architecture of the past has all been guided more or less by conditions of climate. In Southern Europe we see the flat roof and open piazza and balcony, and the cap mouldings and string courses give the idea of holding up or binding together. In the North of Europe we see the steep roof, the mouldings and string courses are undercut to throw the water off the walls—each telling their tale, the one of a hot, dry climate, the other of a cold, wet climate.

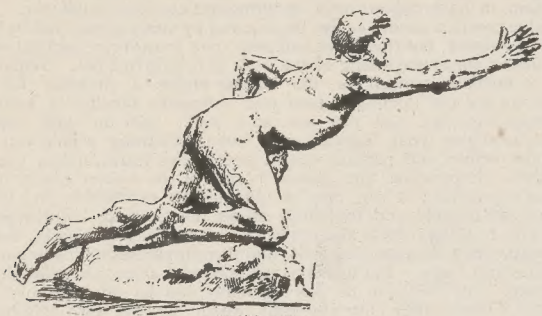
Let us then take the clue from the old masters and design as they did, to suit the climate; we can then be sure we are so far in the right path.

We will have a more difficult problem to solve; we have the warm climate of Italy and the cold climate of Northern Russia, but we have the advantage of seeing how each country designed, and in being guided by Nature let us have a style characteristic of the climate and country.

All this cannot be done in a day, nor a year, nor a lifetime; no style was ever invented in so short a time; it took hundreds of years, but it was always steady progress; let us determine not to progress backward, as the Irishman would say, but let us leave the world further advanced than it was when we entered it.

* Paper read at the Third Annual Convention of the Province of Quebec Association of Architects.

RECREATION AND FURNITURE



SOME NOTES ON THE RELATION AND APPLICATION OF THE SISTER ARTS, PAINTING AND SCULPTURE, TO ARCHITECTURE.*

BY A. T. TAYLOR.

Architecture, Painting and Sculpture, like the three graces, should be intertwined in inseparable bonds in our monumental art. Each may live apart and be beautiful in itself, but the perfect life can only be consummated in conjunction with each other. Architecture, the first-born of the sisters, flourished for a while, but conscious of her needs, took under her sheltering wing her younger sisters, Mural Painting and Monumental Sculpture. Painting and sculpture apart from architecture are later growths, and I cannot but think all suffer from the severance. The earliest examples of painting and sculpture known to us were always employed to heighten the effect and intensify the functions of the architecture, and many of the finest treasures of our picture galleries and sculpture galleries to-day were originally conceived and designed with the setting of some cathedral or noble building.

Let us glance briefly, 1st, at mural painting and color as applied to our architecture, and 2nd, at sculpture and carving in the same relation.

First, of color decoration.—The love of color is natural to man. All savage people have in common the love of bright colors, and we instinctively rejoice in the poly-chromatic feast spread before us in nature, ever varying with the changing year.

Recent researches have demonstrated the fact beyond dispute that in all ages and amongst all peoples color has had an important place in architecture. Hiltorff in his investigations in Sicily and the Acropolis of Selinas and other temples, found abundant traces of rich color on all the buildings, and recent investigations in Greece have abundantly proved the liberal use the Greeks made of color on the exterior of their temples, etc. The custom also prevailed extensively all over France in the middle ages and during the period of the Renaissance, but gradually declined in the reign of Louis XIV. Viollet le Duc, the late eminent architect and antiquarian made a careful examination of Notre Dame cathedral at Paris, and found unmistakable evidence that a large portion of the facade had been radiant with color, and even in England many of the cathedrals there show also remains of colour, but the climate has dealt too rigorously with them to leave much evidence.

Under the sunny skies of Italy, to this day, they revel in the most beautiful colors on the outside of their buildings. The Duomo at Florence and the older Baptistry are glorious in colored marbles, and not a little of the indescribable beauty and loveliness of Giotto's Tower there, is due to its color as seen under soft Italian skies. St. Marks at Venice, both inside and out, is rich in colored marbles and gold mosaics, mellowed by time into beautiful hues.

Somehow when we moderns took to borrowing Roman orders and architecture the dead forms only were reproduced and the rich color was forgotten.

The monotony and dullness of the average streets of cities are very depressing. Some years ago in London the average fashionable house had a dingy colored compo-cement front, and the back was too dreadful to think of; then there came a reaction, and armies of painters appeared, and lo! the fronts of the houses blossomed out in claret color, and sage greens, and blood reds, and mustard yellows, and other colors hard to give a name to; and, although in some cases presenting a somewhat incongruous and piebald appearance, were yet infinitely better than the suicidal looking fronts of old. The next stage was better still—that of using honest material of natural pleasing color which would withstand the smoky atmosphere. So terra cotta and tile work and warm colored stone were and are used.

In New York there was a brown stone period when a man could not show himself in society unless he lived in a brown stone house, and so streets and terraces of brown stone still shadow our spirits. New York and other cities had also their white marble period, when to live in a marble house was thought the acme of bliss, and so leprous looking erections crept out and reared their heads in the streets, and to come nearer home, a cut limestone house was considered amongst ourselves as the sign of eminent respectability. Now, however, more pleasing arrangements of material and color are being introduced,—red and mottled plum colored bricks and

red and warm creamy colored stones meet the eye in all the newer quarters of cities, and in combination with the green of the trees and grass, make pleasant symphonies. We do not want the exterior of our houses to be like harlequins, but neither do we want them to be like quakers or grey nuns.

In passing I would just mention the beautiful majolica or faience work of Luca della Robbia which glows from so many of the facades of the Italian churches. They were chiefly figure work of a religious nature,—holy families, virgins and child saints, etc., but so beautifully modelled and such rich colors burnt in and glazed so as to be almost imperishable. The secret of the art was so well kept by the Robbia family that it died with them and we have been unable to get the full brilliancy of all the colors, but a recussitation of this decoration in some such form would seem to be very suitable to the conditions of modern times.

For the interior decoration and embellishment of our best buildings we have many noble examples in the ancient fresco work still left to us in such buildings as the Sistine Chapel at Rome in the Loggia and Stanzas of the Vatican in the Campo Santa at Pisa, and in numerous churches and public buildings. In these the drama of human life is portrayed in all its lights and shades, whether religious, secular or classical, and I can conceive of no grander or nobler way of applying mural painting to a noble structure than by such representations, embodying—if in a sacred edifice—a nation's religious beliefs and aspirations, and—if in secular buildings—a nation's history and noble deeds of her sons. In our modern work there has been far too little of this—the highest and noblest of ornamentation. We have a little of it in some of our churches and public buildings, more or less satisfactorily carried out. Many examples will occur to you all, such as in Paris in the Pantheon, in the Hemicycle of the Beaux Arts, etc. In London, the Houses of Parliament have been partially treated in the same way, where the Death of Nelson and the Victory at Waterloo are appropriately painted on the walls, and also where scenes from the stirring history of England in the time of Cromwell and the Charles's line the corridors, to keep ever before the eyes of the legislators the lessons of the past. In the Manchester town hall the interior of the walls are being decorated by those gifted geniuses, Frederick Shields and Ford Madox Brown, with subjects from the history of that city. In the Parliament Houses at Ottawa there is a picture commemorating the Confederation of the Dominion, painted by Mr. Harris of our city, a few years ago. This is, however, a framed picture. A series of such would be the most fitting decoration for our legislative halls that I can conceive of, and if instead of being pictures in frames they could be incorporated in the decoration of walls, either in fresco or other other work, they would be better still. In the Bank of Montreal I had the good fortune to be able to formulate some such scheme on a small scale.

There I endeavored to represent in a permanent form scenes in the early history of our country, such as "The Landing of Jacques Cartier at Montreal," "Champlain at the Chaudiere," "La Salle setting out for the discovery of the North West," etc. Our City Halls and Courts of Justice ought to furnish wall spaces for appropriate decorations of this kind, and there is heroism in our own history and in the present day as worthy to be immortalized and handed down to posterity as any in the days of old. There are triumphs of peace as well as of war, victories of the pen as well as of the sword, that are waiting for worthy pictorial representation in all the arts.

We come now to our 2nd and last division of our subject—Sculpture and Carving in relation to Architecture. Certain writers have fallen into the mistake of claiming too much for sculpture on our buildings, declaring that it is the "soul and voice of architecture." With these writers I cannot agree. Were all painted decoration and sculptural ornament omitted from a building, it were possible by reason of perfect proportion, magnificent mass, grace of outline, subtle combination of light and shade, beauty and refinement of mouldings, and balance of parts, to produce a building that would impress all beholders. Of this we have many examples in early ancient work. On the other hand, however, there is no doubt that appropriate sculpture and painting lends an additional charm to the work, lifting it up to a higher plane of excellence and symbolizing in a higher and more tangible degree the aspirations, hopes, faith and morals of the community. In the use of sculpture on our buildings it has always seemed to me that the purpose and object of the building to be thus ornamented should always be kept in mind.

Thus on a church, or other sacred building, the sculptured ornament should have direct reference to sacred subjects and be largely symbolical of the faith, the hopes, the history and the bright examples set before us. You all probably have seen buildings intended for sacred uses that you could not tell from a music or concert hall. If the building is a town hall, in its ornament it should have reference to civic matters and such as affect the common weal; if a court house, it should have ideas embodying law; justice and such like. If the building is a school or college or place of learning, then appropriate symbols and mottos and the names of great men distinguished in special branches of study should be inscribed upon the walls; if a picture gallery, the choice of sculpture and suitable decorations drawn from art is obvious; if a public library and reading room, then English literature is a perfect storehouse of suggestions; if a private house, domestic panels and ornaments of a homelike nature and inscriptions add greatly to the interest. It is no small part of the attraction and charm of the old houses of Edinburgh, Chester, London, etc., to spell out those legends and mottoes and texts that our ancestors loved to carve in stone over their doorways, etc. What an added charm the streets and buildings of our cities would have if this distinctiveness and appropriateness of sculptured ornament and features could only be carried out.

We have many fine examples of what I am trying to advocate, in th

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splendid monuments of the past which remain to us. Foremost amongst these must be placed the grand Parthenon procession of the frieze of the Parthenons, much of which under the name of the "Elgin" marbles can be studied in the British Museum. Then comes the Giotto Tower at Florence, so ably interpreted to us by Ruskin in his "Mornings in Florence." There are 27 panels in sculptured stone round the base, forming a unique series, beginning at the Creation of Adam and going on to represent the exact sciences and the arts, all admirably conceived and worked out, and would well repay hours of study. Just across the way from the tower, a few steps brings us to the famous gates of the Baptistery by Ghiberti, that Michael Angelo said were fit to be the gates of paradise. The whole doors are divided up into panels, which are covered with bas-reliefs of Bible subjects, from the creation to the time of Solomon. In the Cathedral of Orvieto, the portals are also covered with bas-reliefs of Scripture Subjects. In the Doge's palace at Venice, the well-known "Judgment of Solomon" and the other sculptures will readily occur to all. Notre Dame at Paris and the Saint Chapelle have their portals rich with subject sculpture. But it is at Amiens Cathedral that we will find the most complete example of suitable ornament, magnificent in its conception and splendid in its execution. So complete is it that Ruskin has called these western portals the Bible of Amiens. The workmen got *three sous* a day for carving these immortal sculptures. We give some of our workmen \$3 a day for squaring the stone. Imagine our churches glorified with such work! What a delight to examine and study them!

In modern work we have also many interesting examples of appropriate sculpture. In the Albert Memorial at South Kensington, London, you will remember that the base or podium of the monument is surrounded with sculptured figures in alto-relievo of the great masters of all ages, in art, literature, science and music, forming a charmingly interesting procession of the genius of the centuries, and at the corners are beautiful colossal groups symbolical of the four quarters of the globe. In the Natural History Museum at Kensington there are rows of sculptures of extinct animals and up the moulding of the arches monkeys are climbing in a very spirited manner; and to come down to buildings for more common-place uses, I noticed a baker and confectioner's place in Westminster with some excellent panels of terra cotta work representing the different processes through which corn passes before it becomes bread. Why should each building erected for a special use or manufacture not have some expression of its purpose in carved or sculptured form? Our streets would become a museum of art to which future generations would come and find much pleasure and profit in. As we have received noble heritages from our ancestors, so future generations will justly expect a noble heritage from us of good, beautiful and true architecture in its completest form, making use of the sister arts, painting and sculpture, to clothe great clerical truths in immortal shape.

The limit of time at my disposal will not allow of my going more deeply into the subject; and I can only hope that these few notes may lead to useful discussion, and awaken thought and attention to this phase of our beloved art—the advancement of which is so dear to all of us.

PERSONALS.

At the recent opening of the Victoria College building in Toronto, a suitable tribute was paid to the memory of the designer, the late Mr. W. G. Storm.

Particulars have arrived from Paris showing that the death of Paul Peel, the artist, was due to hemorrhage of the lungs, and that he was ill only eight days.

Mr. W. A. Langton, Registrar of the Ontario Association of Architects, has removed his office from the Merchants Bank Building to the Canada Life Building, King street west, Toronto.

We are pleased to hear that Mr. W. B. Cherry, manager of the Adamant Mfg. Co., Toronto, who has been incapacitated for some time past by a severe attack of rheumatism, is rapidly approaching convalescence.

Mr. Wm. MacClennan, an architect by profession, who attained a world-wide reputation as a Scottish dancer, died under a surgical operation in Montreal on Oct. 30th. He had resided in Montreal for three years and was held in much esteem.

Mr. A. L. Husbands has opened an office for the practice of architecture and civil engineering, at Cookshire, Que. Mr. Husbands has been appointed engineer of the proposed new water supply and sewerage systems of that town. He will be pleased to receive catalogues, etc., from supply firms.

The firm of Knox & Elliot, architects, Toronto, has been succeeded by that of Siddall & Baker, composed of Mr. J. Wilson Siddall and Mr. Frank Baker. The firm has removed to new offices in the Janes Buildings, corner of Yonge and King streets. Mr. Baker is the first Canadian student of architecture to pass the examination of the Royal Institute of British Architects.

This is a good rule for preparing an advertisement: Write it out, no matter at what length, putting in everything worth saying; next, examine it critically, with the purpose of ascertaining how many words can be stricken out without injuring the sense. Nothing need be said for ornament. Write plain and honest facts, claim nothing but what is strictly true, and be sure to claim all that is true. Consult taste rather than space in the use of display.—*Printers' Ink.*

SANITATION NEARLY ICHED

THE PLENUM SYSTEM OF VENTILATION AS APPLIED TO THE NEW SURGICAL BUILDINGS OF THE MONTREAL GENERAL HOSPITAL.*

By A. C. HUTCHISON.



THE necessity of efficient ventilation in buildings where large numbers of persons are congregated together will be readily admitted, but in no class of buildings is it so essential as in hospitals, where though the occupants are few in number and the air space allowed to each person is far in excess of what can be allowed in a hall, school, church or theatre which are only occupied for a few hours at a time, there is on the other hand a constant occupation of the wards in an hospital and the necessity for a larger supply of fresh air to a person in sickness than to one in health.

The requirements of the human body are such that when in a state of health a constant supply of fresh air is needful to maintain it in that condition, and that when diseased and weakened by sickness the necessity for an abundant supply of pure air is much increased and in many cases absolutely necessary as a means of restoration to health.

Ventilation may be briefly stated as the process by which the air in closed and inhabited rooms is maintained as nearly as possible at the same standard of purity as the air surrounding the room or building, and only the processes by which this is most successfully accomplished and without causing draughts may be considered efficient.

So much has been said and written on the subject of ventilation, that it is needless for me to describe the composition of the air we breathe, and how the proportions of the gases which compose it are changed in the process of breathing and become impure. Of the various impurities which are found in the air of inhabited rooms, carbonic acid is the most common, and when it is present in the air in a proportion exceeding ten parts in ten thousand we are informed by sanitarians that the air is unfit to dwell or sleep in; the object, therefore, of any process of ventilation, is to introduce such a volume of fresh air into inhabited rooms as will keep the percentage of this gas at the minimum. Authorities on sanitation claim that to preserve the lowest standard of purity one thousand cubic feet per hour, for persons in health is required, while in the case of sick persons the supply should be from two thousand to four thousand cubic feet per hour. In countries of milder and more uniform temperature than we experience, the supply of such large quantities of fresh air to inhabited rooms is not so difficult a problem as it is with us where we have a range of from one hundred and ten, to one hundred and twenty degrees in temperature between the extreme cold of Winter and the heat of Summer, and where for nearly seven months in the year our buildings have to be artificially heated. Where large volumes of air have to be introduced into our buildings during the winter season, the difficulty is much increased by the means which we take to exclude the cold (and at the same time fresh air) by doubling our doors and windows and carefully closing every crevice by which fresh cold air might find entrance. Being thus compelled by the rigor of our winter temperature to prevent the flow of fresh air into our rooms by natural channels, it follows that if a large supply is to be introduced it must be in such a manner that it will not cause discomfort to the occupants.

The problem which presents itself when we are called upon to provide efficient ventilation for any building in the winter season is, how can a large supply of air taken from the outside of the building, at a temperature from freezing down to 20 or 25 below zero be introduced into a room that is almost hermetically sealed, in such a manner as not to cause discomfort by draughts or to lower the temperature of the room below 65 degrees.

It is evident that in solving this problem two conditions must be complied with: first, that the supply of fresh air shall be abundant, and second, that it is heated to a proper temperature. It therefore follows that ventilation and heating are so intimately connected together that we cannot consider the one without the other. The solution of these conditions has caused many methods to be devised, some simple, some complex, and all capable of being divided into two classes, which may be distinguished as Natural Ventilation and Artificial Ventilation.

Under the Natural Ventilation we may class all those methods where no special appliances are used to cause movements in the air and where such movement depends solely on natural forces such as may be obtained by the

* Paper read at the Third Annual Convention of the Province of Quebec Association of Architects.

difference in temperature between the air in the room to be ventilated and the air outside, or by draughts caused by heated flues, or by the force of the wind applied either to forcing air into or exhausting it from the place to be ventilated.

Under Artificial Ventilation we may class all the appliances which depend upon mechanical contrivances for furnishing the force required for causing movements in the air, and also the many kinds of furnaces or heaters, where such movement is caused by the rarefaction of air passing over heated surfaces.

I think it will be admitted that while Natural methods of Ventilation may be tolerated for ordinary dwellings, or for other buildings where there are but few occupants, that for buildings occupied by large numbers of persons, such as schools, halls, churches, theatres, hospitals, etc., where a large supply of fresh air is a necessity, that they are utterly inadequate and not to be depended upon, and that for such buildings some artificial method of ventilation is a necessity.

During our winter season, where there is a difference between the temperature of the air in inhabited rooms and that outside of from forty to one hundred degrees, it is evident that any method of Natural Ventilation will be insufficient where the admission of fresh cold air direct from the outside into a room has to depend upon the opening of doors and windows, or upon Tobin tubes, or any other means by which it is admitted direct without heating, and I think that it will be admitted that where the extraction of vitiated air has to depend upon the draught of flues, or upon the force of the wind acting upon the ejectors or cowls, of whatever form they may be, that they are not in all cases to be relied upon.

For any building to which a large volume of fresh air has to be supplied and then extracted after it has served its purpose, it is evident that some method must be adopted that will be independent of the wind or other natural forces, and that combined with that method must be some means of heating the air to such a degree as will not cause discomfort to the occupants. The many different appliances devised for effecting this twofold object may be divided into three classes.

First. The Plenum System, by which air is forced into the room to be ventilated by the means of a fan operated by steam or other power, the air so forced being warmed by coming into contact with steam-heated pipes or other heated surfaces.

Second. The Exhaust System, by which the air of the room to be ventilated is exhausted or sucked out by the aid of a fan, and fresh air which has been previously warmed is drawn into the room.

Third. Those in which the air is warmed by passing over heated furnaces and then flowing naturally into the room.

I do not here intend to enter upon a discussion of the merits of the different methods I have mentioned as the adoption of either will depend upon the character of the building to be ventilated and the uses to which it is to be applied. It may, however, be of interest to you to explain as briefly as possible the practical application of one of these methods to a building which I was commissioned to erect during the past year, and in which the method adopted has I believe been applied for the first time in the city. The buildings to which I refer are the new Surgical Pavilions of the Montreal General Hospital. (The system of ventilation here referred to is illustrated elsewhere in this number of the CANADIAN ARCHITECT AND BUILDER). These buildings consist of a group of three distinct buildings, an amphitheatre and two pavilions connected together by corridors. The amphitheatre building is about 84 feet by 43 feet and two stories high above the basement; this building contains on the ground floor a number of waiting, reception and examination rooms, and in the second story a large operating theatre with a number of small rooms in connection therewith. Each pavilion is about 155 feet by 34 feet and two stories high above the basement, and contains besides nurses' rooms, kitchens, lavatories, etc., two large wards for 24 beds each and four small wards for 2 beds each, or a total of 112 beds in the two pavilions. The wards and rooms in these buildings that require special ventilation contain in all about 300,000 cubic feet of air, and the problem that presented itself in arranging a system of ventilation was how to provide a supply of air as pure as could be obtained outside of the building to the wards at the rate of not less than 3000 cubic feet per hour for each patient, without causing draughts, and at the same time warming the air to such a degree as would maintain the temperature in the building at not less than 65 degrees during the coldest weather. After careful consideration of the merits of the Plenum and Exhaust methods of ventilation, the former was adopted as being best adapted to perform the work required. For forcing the requisite volumes of air into the buildings a pair of fans, each about six feet in diameter by three feet wide, made by the B. F. Sturtevant Company, of Boston, were installed in the basement of the amphitheatre building and operated by a 28 horse power, high speed, automatic cut off engine, the revolutions of the fan being arranged for 210 per minute. From the fans, ducts made in brick work are carried along below the basement floor of each pavilion and amphitheatre building to vertical shafts leading to the several wards and rooms to be ventilated. In each of the large wards there are six of these vertical shafts, while in the smaller wards and rooms there is only one each; the air is in every case discharged from these shafts into the rooms close to the ceilings. As it was considered of importance that the air discharged into the large wards should be dispersed throughout the upper part of the room before it descended towards the beds, the shafts which are built in the external walls were arranged so as not to be opposite each other, by this arrangement a thorough mixing of the air is secured. The air supplied to the fans is taken through two windows, each 7' 0" x 4' 0"

and to procure the air as free from dust as possible, these windows open into a court between the two pavilions where there is little danger from dust from the streets reaching them.

With the fans in operation at a speed of 210 revolutions per minute a large volume of air is forced into every room, a measurement made with an air meter showing the actual quantity to be about 1,182,000 cubic feet per hour. At this rate the air in each room would be changed about four times every hour, while the supply to each patient in the wards would be at the rate of between 4500 and 5000 cubic feet per hour. Any one who has had experience in conveying warm air through pipes or ducts will readily understand the difficulty that is often met with in sending an equal volume of air through two pipes or ducts of equal dimensions and similarly placed.

In arranging the ducts and flues it was anticipated that this difficulty would be met, and that some shafts would convey a greater volume of air into the rooms than others, even though they were of the same size and placed in the same position in relation to the main duct. A test with the air meter proved this to be the case, and it was found that some openings gave double the volume of air supplied by others.

To regulate the flow of air in each shaft and make them as nearly as possible uniform in operation, a regulating valve was placed at the base of each vertical shaft and arranged so that the engineer could control the flow.

The fresh air as before described is supplied to each room near the ceiling, from whence it descends towards the floor and is thence carried away through gratings placed in the skirtings into ducts below the floors to the extracting shafts, which are three in number, one in each pavilion and one in the amphitheatre. These shafts have each an area of one square foot, to about each 5000 cubic feet in the building with which they are connected, and are carried up in brick work to about ten feet above the roofs. Each shaft contains a coil of steam pipes which may be used for rarefying the air and causing a draught at any time when the fans may not be in operation.

Wishing to avoid the placing of heating coils or radiators in the wards it became necessary to heat the air supplied to the fans to such a degree before it entered the wards as would keep them comfortable in the coldest weather.

To effect this object indirect steam radiators are employed, and the air is heated before it passes through the fans by a hot blast apparatus made by the B. F. Sturtevant Company. This apparatus consists of 7000 feet of 1 inch pipe arranged in a great number of sections, each section composed of two upright pipes fixed in a cast-iron base and connected together at the top by a cross pipe. The length of pipe in the sections varies, but in the longest it is not over 23 feet, so that however rapid the condensation of steam in a section when the air is rapidly passing over it, at a temperature of 20 degrees below zero, there is no danger of freezing. These heating pipes are placed directly in front of the fans, and opposite the windows by which air is admitted to the building, so that no air can find its way into the ducts until it has come in contact with the steam pipes and been heated. The manufacturers of the apparatus considered that 7000 feet of pipe arranged in this manner would be sufficient to heat all the air supplied to the wards and rooms, but as I was afraid that in seasons when the temperature remains at from 10 to 20 degrees below zero for three or four days at a time, it would not be equal to the work, I arranged a reinforcing or supplementary heating chamber in the basement, at the bottom of each vertical shaft, and in these chambers placed cast-iron radiators, over which the air could be forced to flow when it was found necessary to heat it to a greater degree than was possible with the fan alone. The radiators placed in these chambers were equal, in the whole of the buildings, to about 11000 feet of 1 inch pipe, thus giving a total heating surface, including the piping in the hot blast apparatus, of 5666 superficial feet, or equal to 17000 feet lineal of 1 inch pipe.

The flow of air into the wards, either direct from the fan, or after it has passed over the radiator in the reinforcing chamber, is entirely under the control of the nurse in each ward, who can regulate it by means of a valve operated in the ward. By thus having two means of heating the air, first by the hot blast apparatus, and second, by the radiators in the reinforcing chamber, it is expected that economy in the use of coal can be exercised and an equal temperature maintained in the wards during the winter months.

The Steel Clad Bath and Metal Co., of Toronto, have issued a pocket memorandum book, handsomely bound in red morocco, with the company's advertisement embossed thereon in gold.

A new building, 60x40 feet in size, has recently been erected for, and is now occupied by Messrs. R. Dennis & Son, wire and iron manufacturers, London, Ont.

The Bostwick Metal Lath Co., of 116 St. Peter street, Montreal, have issued a pamphlet containing the testimonials of a number of Canadian and American architects, to the satisfactory character of this style of lath. A sample of the material is attached to the book.

The Standard Drain Pipe Co., of St. Johns, Que., are applying to Parliament for increase of capital from \$150,000 to \$500,000. This company has been in existence 8 years and has already increased to 18 times the original capacity. The building covers 46,000 square feet, with 10 large down draft kilns, some of which are 28 feet inside diameter, and hold 70 tons of pipes each. They will probably double the capacity of the factory.